GS-800 All Professional Engineering Positions GS-800

Use these individual occupational requirements for all professional engineering series in conjunction with the "Group Coverage Qualification Standard for Professional and Scientific Positions." The following occupations are included:

Basic Requirements:

A. Degree: professional engineering. To be acceptable, the curriculum must: (1) be in a school of engineering with at least one curriculum accredited by the Accreditation Board for Engineering and Technology (ABET) as a professional engineering curriculum; or (2) include differential and integral calculus and courses (more advanced than first-year physics and chemistry) in five of the following seven areas of engineering science or physics: (a) statics, dynamics; (b) strength of materials (stress-strain relationships); (c) fluid mechanics, hydraulics; (d) thermodynamics; (e) electrical fields and circuits; (f) nature and properties of materials (relating particle and aggregate structure to properties); and (g) any other comparable area of fundamental engineering science or physics, such as optics, heat transfer, soil mechanics, or electronics.

OR

B. Combination of education and experience—college-level education, training, and/or technical experience that furnished (1) a thorough knowledge of the physical and mathematical sciences underlying professional engineering, and (2) a good understanding, both theoretical and practical, of the engineering sciences and techniques and their applications to one of the branches of engineering. The adequacy of such background must be demonstrated by one of the following:

1. *Professional registration*—Current registration as a professional engineer by any State, the District of Columbia, Guam, or Puerto Rico. Absent other means of qualifying under this standard, those applicants who achieved such registration by means other than written test (e.g., State grandfather or eminence provisions) are eligible only for positions that are within or closely related to the specialty field of their registration. For example, an applicant who attains registration through a State Board's eminence provision as a manufacturing engineer typically would be rated eligible only for manufacturing engineering positions. ☞

GS-800 (Continued)

2. *Written test*—Evidence of having successfully passed the Engineer-in-Training (EIT) examination, or the written test required for professional registration, which is administered by the Boards of Engineering Examiners in the various States, the District of Columbia, Guam, and Puerto Rico.

   Applicants who have passed the EIT examination and have completed all the requirements for either (a) a bachelor's degree in engineering technology (BET) from an accredited college or university that included 60 semester hours of courses in the physical, mathematical, and engineering sciences, or (b) a BET from a program accredited by the Accreditation Board for Engineering and Technology (ABET) may be rated eligible for certain engineering positions at GS-5. Eligibility is limited to positions that are within or closely related to the specialty field of the engineering technology program. Applicants for positions that involve highly technical research, development, or similar functions requiring an advanced level of competence in basic science must meet the basic requirements in paragraph A.

   Because of the diversity in kind and quality of BET programs, graduates of other BET programs are required to complete at least 1 year of additional education or highly technical work experience of such nature as to provide reasonable assurance of the possession of the knowledge, skills, and abilities required for professional engineering competence. The adequacy of this background must be demonstrated by passing the EIT examination.

3. *Specified academic courses*—Successful completion of at least 60 semester hours of courses in the physical, mathematical, and engineering sciences and in engineering that included the courses specified in the basic requirements. The courses must be fully acceptable toward meeting the requirements of a professional engineering curriculum as described in paragraph A.

4. *Related curriculum*—Successful completion of a curriculum leading to a bachelor's degree in engineering technology or in an appropriate professional field, e.g., physics, chemistry, architecture, computer science, mathematics, hydrology, or geology, may be accepted in lieu of a degree in engineering, provided the applicant has had at least 1 year of professional engineering experience acquired under professional engineering supervision and guidance. Ordinarily there should be either an established plan of intensive training to develop professional engineering competence, or several years of prior professional engineering-type experience, e.g., in interdisciplinary positions. (The above examples of related curricula are not all-inclusive.)

Note: An applicant who meets the basic requirements as specified in A or B above may qualify for positions in any branch of engineering unless selective factors indicate otherwise, or unless he/she qualifies under the provisions of B.2 related to the EIT examination or BET degree.

Additional Experience and Training Provisions for Graduates of Professional Engineering Curricula:

a. Superior academic achievement at the baccalaureate level in a professional engineering curriculum is qualifying for GS-7.

b. Individuals can be converted noncompetitively to a GS-7 position if they complete all the requirements of a Federal baccalaureate level student-trainee program, including 1040 hours of work experience, 320 hours of which was at the GS-5 level.

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GS-800 (Continued)

c. A combination of superior academic achievement and 1 year of appropriate professional experience is qualifying at GS-9.

d. Applicants with an engineering degree who have appropriate experience as a technician equivalent to grade GS-5 or higher may have such experience credited for grade GS-7 only on a month-for-month basis up to a maximum of 12 months.

e. Successful completion of a 5-year program of study of at least 160 semester hours leading to a bachelor's degree in engineering is qualifying at GS-7. Completion of such a program and 1 year of appropriate professional experience is qualifying at grade GS-9.

Definition of Professional Engineering Experience: The professional engineering experience required for grades GS-7 and above is defined as nonroutine engineering work that required and was characterized by (1) professional knowledge of engineering; (2) professional ability to apply such knowledge to engineering problems; and (3) positive and continuing development of professional knowledge and ability.

Professional knowledge of engineering is defined as the comprehensive, indepth knowledge of mathematical, physical, and engineering sciences applicable to a specialty field of engineering that characterizes a full 4-year professional engineering curriculum leading to a bachelor's degree, or the equivalent.

Professional ability to apply engineering knowledge is defined as the ability to (a) apply fundamental and diversified professional engineering concepts, theories, and practices to achieve engineering objectives with versatility, judgment, and perception; (b) adapt and apply methods and techniques of related scientific disciplines; and (c) organize, analyze, interpret, and evaluate scientific data in the solution of engineering problems.

Professional work in engineering, like that in other professions, is marked by continuing personal effort to keep abreast of the advancing and changing discipline. Continuing education in engineering and related fields is an important element of full professional competence as an engineer that should be considered in evaluating the qualifications of applicants for professional engineering positions.

In some situations, experience may be creditable even if it is not clearly professional engineering work. In such cases, the experience must have been preceded by prior responsible professional engineering experience and must contribute directly and significantly to the applicant's engineering competence. For example, an engineer might be assigned to a management-type position in preparation for assumption of higher-level responsibilities in engineering project or program management.

Graduate Education:

1. Individuals can be converted noncompetitively to a GS-9 position if they complete all the requirements of a Federal graduate-level student-trainee program, including completion of a master's degree in engineering and completion of 640 hours of work experience, 320 hours of which was at GS-7.

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GS-800 (Continued)

2. Regardless of the field of undergraduate study, completion of the requirements for a master's or higher degree in engineering is fully qualifying for the grade indicated, provided the applicant's total background, i.e., education and any experience, demonstrates evidence of knowledge, skills, and abilities that are substantially equivalent to those acquired through the successful completion of the courses specified in paragraph A.

3. With a bachelor's degree in engineering, graduate education in a related field is acceptable in lieu of graduate study in engineering for appropriate types of positions. For example, a B.S. in engineering plus a master's degree in business administration would be qualifying for Industrial Engineer, GS-9, but not for GS-9 laboratory positions in research and development. The key consideration in determining if such graduate education should be credited is whether or not the education provided the knowledge, skills, and abilities necessary to perform the work of the position being filled.

Special Competence in Particular Areas of Engineering: Many engineering positions demand specific competence in a particular function or area. For such positions, agencies may use selective factors to identify those applicants whose records show evidence of the required capabilities. Such selective factors can be used for positions at all grade levels covered by this standard.

Engineering Registration: Registration as a professional engineer is an appropriate selective factor for appointment to certain, typically high-level, engineering positions. The key consideration is that registration must be *essential* for acceptable performance of the work of the position to be filled. Accordingly, it is an appropriate requirement for positions with duties and responsibilities that satisfy one of the following criteria:

- Responsibility for final approval of designs of major structures and facilities involving public safety where such compliance with State laws meets an essential need of the engineering organization to provide objective evidence to agency management and the public that the work is performed by engineers of proven competence.
- Responsibility for engineering determinations concerning contract awards or other major aspects of design and construction work to be performed by engineers in the private sector, where registration is essential to have their full confidence and respect to achieve cooperation on critical engineering issues.

When an engineering position has duties and responsibilities that would support a requirement for registration and a requirement is established, the position description should clearly document the basis for the requirement. It would be inappropriate to require that applicants be registered for positions with less responsibility than that indicated above, for positions that involve responsibilities and functions such as research and development, or for the sole purpose of improving the "image" of engineers in the Federal service. For those positions where registration is an appropriate requirement, such positions have been characteristically filled by registered professional engineers. If a currently filled position is newly identified as requiring a professional engineer, the requirement for registration should be waived for the duration of the employee's incumbency.

The Engineer-in-Training Test: The Engineer-in-Training (EIT) test is the first part of the professional registration examination for engineers in the various States. The EIT test is a test of engineering fundamentals generally taken by engineering school seniors or recent graduates. Those who pass are certified as Engineer-in-Training. The second part of the registration examination, covering practice in a branch of engineering, is taken after a specified period of experience required for registration as a professional engineer. ☞

GS-800 (Continued)

The EIT test is used under this standard to determine whether competitors without a degree in engineering or other qualifying education have a knowledge and understanding of mathematical, physical, and engineering sciences required to perform professional engineering work in a specialty field of engineer-ing. This test is not to be considered as being in lieu of the requirement of at least 4 years of experience and/or education that might be regarded as providing such knowledge.

The EIT test is developed and administered by the State Board of Engineering Examiners in each State or comparable jurisdiction. The test is not administered by the U. S. Office of Personnel Management. Persons who desire to take the Engineer-in-Training test should direct their inquiries to the Secretaries of the appropriate State Boards.

College Teaching: College-level teaching of engineering may be considered as professional experience in engineering. In accepting and evaluating teaching experience, all specific qualification requirements pertaining to the evaluation of professional experience such as grade level, responsibility, scope, specialization, and knowledge required are also applicable to the evaluation of teaching experience. Teaching experience that is accompanied by a significant amount of research, direction of research, investigative, or similar work may be credited at full value in meeting a specific requirement for research, investigative, or similar experience.

Guide for the Evaluation of Engineering Curricula: The Accreditation Board for Engineering and Technology (formerly the Engineers' Council for Professional Development) accredits specific engineer-ing and engineering technology curricula; it does not accredit institutions. Thus, an accredited college may have (1) ABET-accredited professional engineering curricula ; (2) professional engineering curricula that are not ABET-accredited; and (3) 4-year curricula in engineering technology that may or may not be ABET-accredited.

The Accreditation Board for Engineering and Technology publishes two bulletins: "Accredited Curricula Leading to First Degrees in Engineering" and "Accredited Curricula Leading to First Degrees in Engineering Technology." Those wishing to obtain copies of these bulletins should contact the Accreditation Board for Engineering and Technology, 345 East 47th Street, New York, N.Y. 10017. A summary of ABET-accredited engineering programs also appears periodically in the *Journal of Engineering Education*.

Some engineering curricula are acceptable as meeting the basic requirements even though such curricula are not specifically accredited by the Accreditation Board for Engineering and Technology. As a general rule, any professional engineering curriculum in an engineering school that has one or more of its curricula accredited by ABET may be accepted. It should be noted, however, that some universities have curricula identified as engineering curricula outside the engineering school, e.g., in the school of architecture or forestry. Such curricula need to be reviewed to see if they comply with the requirements of paragraph A.(2) of the basic requirements.

GS-801 General Engineering Series GS-801

Use the GS-800 individual occupational requirements for Professional Engineering Positions.

GS-802 Engineering Technician Series GS-802

Use these individual occupational requirements in conjunction with the "Group Coverage Qualification Standard for Technical and Medical Support Positions."

Specialized Experience (for positions at GS-4 and above): Examples of occupations that may have provided qualifying specialized experience include: draftsperson, surveying technician, construction estimator , physical science technician, or mathematical technician.

Experience in a trade or craft may be credi ted as specialized experience when the work provided intensive knowledge of engineering principles, techniques, methods, and precedents. Examples are trade positions with substantial developmental, test, or design responsibilities such as:

- Planner and estimator who analyzed designs for production purposes.
- Instrumentmaker or modelmaker who performed design or development work on devices fabricated.

OR

Education and Training:

For GS-3: Successful completion of l year of study that included at least 6 semester hours in an y combination of courses such as engineering, engineering or industr ial technology, construc-tion, physics, drafting, surveying, physical science, or mathematics.

For GS-4: Successful completion of 2 years of study that included at least 12 semester hours in an y combination of courses such as those shown above for GS-3.

For GS-5: Successful completion of a full 4-year course of study leading to a bachelor's degree (a) with major study in an appropriate field of engineering, construction, or industrial technology; o r (b) that included at least 24 semest er hours in any combination of courses such as those shown above for GS-3.

Certification: Engineering technicians may be certified by the National Institute for Certification i n Engineering Technologies, an organization sponsored by the National Society of Professional Engineers. Certification by the Institute will be helpful as a measure of the technician's quality of experience.

GS-803 Safety Engineering Series GS-803

Use the GS-800 individual occupational requirements for Professional Engineering Positions.

GS-804 Fire Protection Engineering Series GS-804

Use the GS-800 individual occupational requirements for Professional Engineering Positions.

GS-806 Materials Engineering Series GS-806

Use the GS-800 individual occupational requirements for Professional Engineering Positions.

GS-807 Landscape Architecture Series GS-807

Use these individual occupational requirements in conjunction with the "Group Coverage Qualification Standard for Professional and Scientific Positions."

Basic Requirements:

A. Degree: landscape architecture or landscape design.

OR

B. Combination of education and experience—for each year short of graduation, the applicant must have had 1 year of experience under professional leadership and guidance of such character and diversity as to be a satisfactory substitute for the required education. This experience must have included original landscape design.

Note: Successful completion of a 5-year program of study of at least 160 semester hours leading to a bachelor's degree in landscape architecture in an accredited college or university is qualifying for GS-7.

Experience Equivalent to a Degree in Landscape Architecture: A degree in landscape architecture indicates that an applicant has the basic background to perform professional landscape architectural work at the beginning levels, and has the potential to develop the skills and abilities required at the higher levels. Experience may be substituted for education to the extent that it provided the equivalent back-ground. However, because an education provides some knowledge that cannot be measured in terms of course content, but rather is part of general knowledge and cultural background gained as a result of interrelationships among courses, careful judgment must be used in evaluating experience substituted for education as provided for in paragraph B of the basic requirements.

The objective of providing for the substitution of experience for education is to avoid excluding proven professional landscape architects from the Federal service. However, relatively few applicants will qualify on the basis of experience alone. The time required in the case of an individual applicant to acquire the required experience may take substantially more than 4 years. In view of the breadth and depth of training required, it is rare that a person will qualify without some course work in addition to experience.

Applicants who apply on the basis of experience in lieu of education are required to show how their background is equivalent to a degree. In order to qualify at the entrance level, non-degree applicants typically must have experience or study that included site planning; layout of circulation patterns; grading and drainage plans; planting plans; collaboration with architects and/or engineers; and the supervision or review of landscape construction.

Evaluation of Experience: The following kinds of experience are not acceptable as professional landscape architectural experience: routine drafting or developing of plans where original investigations or designs are not involved; laying out or executing illustrations in black-and-white or in color; nursery work involving the propagation of trees, shrubs, vines, etc.; experimental, horticultural, or landscape garden-ing; breeding, testing, propagation, culture, and production of plants, flowers, trees, crops, etc.; forestry work involving the management of forest resources for the continuous production of timber, water, forage, and other forest values; architectural and engineering work limited to the design of structures; work in city and community planning that relates primarily to the broad social and economic growth of cities and communities and the organization of community services and facilities.

GS-808 Architecture Series GS-808

Use these individual occupational requirements in conjunction with the "Group Coverage Qualification Standard for Professional and Scientific Positions."

Basic Requirements:

A. Degree: architecture; or related field that included 60 semester hours of course work in architecture or related disciplines of which at least (1) 30 semester hours were in architectural design, and (2) 6 semester hours were in each of the following: structural technology, properties of materials and methods of construction, and environmental control systems.

OR

B. Combination of education and experience—college-level education, training, and/or technical experience that furnished (1) a thorough knowledge of the arts and sciences underlying professional architecture, and (2) a good understanding, both theoretical and practical, of the architectural principles, methods, and techniques and their applications to the design and construction or improvement of buildings. The adequacy of such background must be demonstrated by at least one of the following:

1. *Related Curriculum:* Degree in architectural engineering may be accepted as satisfying in full the basic requirements, provided the completed course work in architectural engineering provided knowledge, skills, and abilities substantially equivalent to those provided in the courses specified in paragraph A. The curriculum for a degree in either architecture or architectural engineering covers function, esthetics, site, structure, economics, mechanical-electrical, and other engineering problems related to the design and construction of buildings primarily (but not exclusively) intended to house human activities. The courses required for a degree in architecture generally place emphasis upon planning, esthetics, and materials and methods of construction, while the courses for an architectural engineering degree place equal or greater weight on the technical engineering aspects such as structural systems, mechanical systems, and the properties of materials. Because of this difference in emphasis, persons with degrees in architecture may have a preference for work assignments that offer greater opportunities for them to express their artistic and creative abilities. As a result, they may be more concerned with planning and design aspects of architecture, and persons with degrees in architectural engineering may be more engaged in aspects emphasizing technical engineering considerations.

2. *Experience:* An applicant lacking a degree in architecture must have had 1 year of experience in an architect's office or in architectural work for each year short of graduation from a program of study in architecture. In the absence of college courses, 5 years of such experience is required. This experience must have demonstrated that the applicant has acquired a thorough knowledge of the fundamental principles and theories of professional architecture.

Alternate Requirements for GS-7:

a. Successful completion of a 5-year program of study of at least 160 semester hours leading to a Bachelor of Architecture or higher degree in an accredited college or university is qualifying for GS-7.

b. Applicants with an architecture degree who have appropriate experience as a technician equivalent to grade GS-5 or higher may have such experience credited for grade GS-7 only on a month-for-month basis up to a maximum of 12 months.

(*Note:* These provisions also apply to graduates of architectural engineering curricula.)

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GS-808 (Continued)

Registration: Candidates registered to practice architecture by one of the State registration boards, using standards in compliance with the basic minimum provisions recommended by the National Council of Architectural Registration Boards, are recognized as meeting the full requirements for eligibility at GS-11.

Nonqualifying Experience: The following kinds of experience are *not* acceptable as professional architectural experience: professional landscape architecture work consisting mainly of the layout, design, construction, or maintenance of land areas and landscape features, including ground and water forms, vegetation, roads, walks, incidental structures, and other landscape features; experience in the application of artistic embellishment to practical design such as the decoration of interiors, including the construction, layout, and selection of furniture and furnishings that do not alter the basic architectural design of the interior; city and community planning work that relates to the broad social and economic growth and development of such community services and facilities as industry, commerce, transportation, streets, utilities, and parks.

Architectural Registration as a Selective Factor: Registration as a professional architect is an appropriate selective factor for appointment to certain, typically high-level, architect positions. The key consideration is that registration must be *essential* for acceptable performance of the work of the position to be filled. Accordingly, it is an appropriate requirement for positions with duties and responsibilities that satisfy one of the following criteria:

- Responsibility for final approval of design standards and criteria for designs of major buildings and related structures involving public safety where such compliance with State laws meets an essential need of the architectural organization to provide objective evidence to agency management and the public that the work is performed by architects of proven competence.
- Responsibility for architectural determinations concerning contract awards or other major aspects of design and construction work to be performed by architects in the private sector where registration is essential to have their full confidence and respect to achieve cooperation on critical architectural issues.

Some architect positions in the Federal service have duties and responsibilities that would support a requirement for registration. The position description should clearly document the basis for the registration requirement. It would not be appropriate to require that candidates be registered for positions with less responsibility than that indicated above, for positions that involve responsibilities and functions such as research, or for the sole purpose of improving the "image" of architects in the Federal service. Because of the importance of registration for those positions where it is an appropriate requirement, such positions have been characteristically filled by registered professional architects. If a currently filled position is newly identified as requiring a registered architect, the requirement for registration should be waived for the duration of the employee's incumbency.

GS-809 Construction Control Series GS-809

Use these individual occupational requirements in conjunction with the "Group Coverage Qualification Standard for Technical and Medical Support Positions."

Specialized Experience (for positions at GS-4 and above): Examples of qualifying specialized experience include:

- Engineering aid or technician or surveying technician performing work directly related to construction.
- Construction inspector or construction representative responsible for interpreting plans and specifications, inspecting materials and workmanship, and insuring adherence to safety requirements.
- Supervisor of craftspersons, equipment operators, or mechanics engaged in construction work, provided that the experience involved responsibility for interpreting plans and specifications and inspecting workmanship for adherence to such plans and specifications.

OR

Education and Training:

For GS-3: Successful completion of 1 year of study that included at least 6 semester hours of courses in one or a combination of courses such as drafting, surveying, mathematics, physical science, industrial technology, industrial arts, or technical subjects pertinent to construction; or engineering technician work such as electricity, material testing, or engineering mechanics.

For GS-4: Successful completion of 2 years of study that included at least 12 semester hours in any combination of courses such as those shown above for GS-3.

For GS-5: Successful completion of a full 4-year course of study leading to a bachelor's degree (a) with major study in an appropriate field of engineering, construction, or industrial technology; or (b) that included at least 24 semester hours in any combination of courses such as those shown above for GS-3.

GS-810 Civil Engineering Series GS-810

Use the GS-800 individual occupational requirements for Professional Engineering Positions.

GS-817 Surveying Technician Series GS-817

Use these individual occupational requirements in conjunction with the "Group Coverage Qualification Standard for Technical and Medical Support Positions."

Specialized Experience (for positions at GS-4 and above): Examples of qualifying specialized experience include work as an engineering technician, soil conservation technician, or construction inspector.

OR

Education and Training:

For GS-3: Successful completion of 1 year of study that included at least one course in surveying, engineering, industrial technology, construction, physics, drafting, forestry, geography, navigation, cartography, physical science, or mathematics.

For GS-4: Successful completion of 2 years of study that included at least 12 semester hours in any combination of courses such as those shown above for GS-3.

For GS-5: Successful completion of a full 4-year course of study leading to a bachelor's degree (a) with major study in an appropriate field of surveying, engineering, construction, or industrial technology, or (b) that included at least 24 semester hours in any combination of courses such as those shown above for GS-3.

GS-818 Engineering Drafting Series GS-818

Use these individual occupational requirements in conjunction with the "Group Coverage Qualification Standard for Technical and Medical Support Positions."

Specialized Experience (for positions at GS-4 and above): Experience that involved preparing engineering or architectural drawings using drafting techniques, and making mathematical computations usin g standardized tables and formulas.

OR

Education and Training:

For GS-3: Successful completion of l year of study that included at least one course in engineering , engineering or industrial technology, construction, drafting, surveying, physical science, o r mathematics.

For GS-4: Successful completion of 2 years of study that included at least 12 semester hours in an y combination of courses such as those shown above for GS-3. At least 3 of the 12 semeste r hours must have been in drafting.

For GS-5: Successful completion of a full 4-year course of study leading to a bachelor's degree tha t included major study or at least 24 sem ester hours in any combination of courses such as those shown above for GS-3. At least 6 of the 24 semester hours must have been in drafting.

Drafting Samples (Optional): Applicants for positions at gr ades GS-4 and above may be required to submit drafting samples. These samples should indicate a knowledge of drafting principles, techniques, an d practices, as well as skill and proficiency in actually preparing drawings, to a degree consistent with the duties of the position. Applican ts should be encouraged to prepare samples that will do full justice to their abilities.

Samples must be original drawings, or tracings or print s of original drawings, the same size as the original, i.e., not reduced. They must include or be supplemented by examples of f reehand lettering. Applicants must sign all samples. Above their signature, there mus t be a statement that all drafting was performed by them, or in case they did no t do all the work on the sheet, a statement clearly indicating the nature and extent of their own work on the sample.

GS-819 Environmental Engineering Series GS-819

Use the GS-800 individual occupational requirements for Professional Engineering Positions.

GS-828 Construction Analyst Series GS-828

Use these individual occupational requirements in conjunction with the "Group Coverage Qualification Standard for Administrative and Management Positions."

EDUCATION

Undergraduate and Graduate Education: Major study—architecture, engineering, building construction, or other fields related to the position.

OR

EXPERIENCE

General Experience (for GS-5 positions): Experience in reading and interpreting working drawings of buildings, or other comparable engineering or architectural structures, and in other duties related to architecture, construction, civil, mechanical, and electrical engineering. Work should have provided construction knowledge of material estimating, cost estimating, work planning, construction work methods, inspection, quality control on materials and workmanship, and safety procedures.

Specialized Experience (for positions above GS-5): Experience in the preparation or review of plans, specifications, or estimates of materials and costs for the construction, extension, alteration, or repair of buildings. Applicants should have knowledge of the residential construction field, and experience in the development of plans and specifications, and in negotiation work. This experience may have been obtained working as a contractor or as a draftsperson in an architectural engineering firm. However, any drafting experience must have provided an opportunity to acquire technical knowledge.

Appropriate experience includes working with diverse construction materials (brick, lumber, reinforced concrete, steel) and types of structures (housing, single-family dwellings and multi-family apartment units, and industrial and commercial structures). Applicants should be familiar with matters such as planning a subdivision, laying out traffic flow in a multi-family apartment structure, or working out specification problems in plans.

GS-830 Mechanical Engineering Series GS-830

Use the GS-800 individual occupational requirements for Professional Engineering Positions.

GS-840 Nuclear Engineering Series GS-840

Use the GS-800 individual occupational requirements for Professional Engineering Positions.

GS-850 Electrical Engineering Series GS-850

Use the GS-800 individual occupational requirements for Professional Engineering Positions.

GS-854 Computer Engineering Series GS-854

Use the GS-800 individual occupational requirements for Professional Engineering Positions.

GS-855 Electronics Engineering Series GS-855

Use the GS-800 individual occupational requirements for Professional Engineering Positions.

GS-856 Electronics Technician Series GS-856

Use these individual occupational requirements in conjunction with the "Group Coverage Qualification Standard for Technical and Medical Support Positions."

Specialized Experience (for positions at GS-4 and above): Examples of qualifying specialized experience include:

- Work as a technician, instructor, inspector, or mechanic (civilian or military) that showed progression in theoretical and practical knowledge of electronic theory, and of th e characteristics, function, operation, and capabilities of a variety of types of electronic equipment. This experience must have included the use of schematic diagrams, a variety of test equipment, and the application of appropriate electroni c formulas involved in such duties as testing, troubleshooting, modifying, designing, calibrat-ing , installing, maintaining, repairing, constructing, developing, and instructing on electronic equipment, or similar functions.
- Experience in developing policies, standards, and procedures for maintenance, installation, or simila r functions, provided the work clearly shows that the applicant applied a specialized knowledge of th e theories and principles of a variety of electronic systems or equipment.
- Experience doing bench repair of television and radio receivers in a commercial shop in which th e applicant did troubleshooting on a variety of equipment and used such special test equipment as sweep generators, marker generators, oscillo scopes, and other equipment normally employed in such servicing will be acceptable as specialized experience at GS-6 an d below, if applicable to the work of the position.

OR

Education and Training:

For GS-4: Successful completion of 2 years of study that included at least 12 semester hours i n engineering, physical science, te chnology, or mathematics. At least 6 of the 12 semester hours must have been in electronics courses.

For GS-5: Successful completion of (a) all the requirements for a bachelor's degree in electrica l engineering, electronics engineering, or electronics technology, (b) 3 years of study in a n accredited (by the Accreditation Board for Engineering and Technology (ABET)) curriculum in electronics, or (c) a full 4-year course of study leading to a bachelor's degree that included major study or at least 24 semester hours in any combination of courses such as those shown above for GS-4. At least 12 of the 24 semester hours must have been in electronics courses.

Alternate Standard: The Examining Guide for Electronics Mechanic (2604) can be used as an alternat e standard for qualifying applicants for either competitive or noncompetitive actions.

GS-858 Biomedical Engineering Series GS-858

Use the GS-800 individual occupational requirements for Professional Engineering Positions.

GS-861 Aerospace Engineering Series GS-861

Use the GS-800 individual occupational requirements for Professional Engineering Positions.

GS-871 Naval Architecture Series GS-871

Use the GS-800 individual occupational requirements for Professional Engineering Positions.

GS-873 Ship Surveying Series GS-873

This is an individual qualification standard.

EXPERIENCE REQUIREMENTS

Specialized Experience (for all positions): Applicants must have had 1 year of specialized experienc e equivalent to at least the next lower grade level in the normal line of progression. Specialized experience is responsible work in the maintenance and repair of ocean-going vessels that demonstrated the ability to survey and inspect such vessels for the purposes of classification, appraisal, determination of genera l conditions and fitness for operation, and determina tion of the extent of damage sustained and type and cost of repairs and reconditioning required. This experience may have been gained in marine surveying o r other work such as:

- Seagoing experience as a U.S. Coast Guard licensed marine engineer in t he merchant marine. For GS-11, applicants must have sailed under a 2nd A ssistant license for at least 1 year. For GS-12, applicants must have sailed under a 1st Assistant license for at least 1 year . For GS-13, applicants must have sailed under a Chief's license for at least 1 year.
- Experience in a ship repair yard or in the engineering department of a steamship company serving i n positions such as marine superintendent or port engineer.

GS-880 Mining Engineering Series GS-880

Use the GS-800 individual occupational requirements for Professional Engineering Positions.

GS-881 Petroleum Engineering Series GS-881

Use the GS-800 individual occupational requirements for Professional Engineering Positions.

GS-890 Agricultural Engineering Series GS-890

Use the GS-800 individual occupational requirements for Professional Engineering Positions.

GS-892 Ceramic Engineering Series GS-892

Use the GS-800 individual occupational requirements for Professional Engineering Positions.

GS-893 Chemical Engineering Series GS-893

Use the GS-800 individual occupational requirements for Professional Engineering Positions.

GS-894 Welding Engineering Series GS-894

Use the GS-800 individual occupational requirements for Professional Engineering Positions.

GS-895 Industrial Engineering Technician Series GS-895

Use these individual occupational requirements in conjunction with the "Group Coverage Qualification Standard for Technical and Medical Support Positions."

Specialized Experience (for positions at GS-4 and above): Examples of qualifying specialized experience include:

- Experience that involved work measurement, simplification, and standardization.
- Methods analysis and improvement.
- Analysis and design of work center facilities and equipment.
- Planning and control of industrial operations.

OR

Education and Training:

For GS-4: Successful completion of 2 years of study that included at least 12 semester hours in an y combination of courses in engineering, technology, industrial mana gement, industrial rela-tions, public or business administration, mathematics, statistics, physical science, psychology, o r vocational education.

For GS-5: Successful completion of a full 4-year course of study leading to a bachelor's degree with major study or at least 24 semester hours in any combination of courses such as those shown above for GS-4.

GS-896 Industrial Engineering Series GS-896

Use the GS-800 individual occupational requirements for Professional Engineering Positions.

GS-899 Engineering and Architecture Student Trainee Series GS-899

Use the "Group Coverage Qualification Standard for Competitive Service Student Trainee Positions," as appropriate to the appointing authority used.